**Amendments to the Claims:**

This listing of claims will replace all prior versions and listing of claims in the application.

**Listing of Claims:**

1. (Currently Amended) A method of measuring properties of particles, comprising the steps of:

generating a beam of radiation ~~(IB)~~ which is propagated along a principal direction ~~(z)~~,

illuminating with the beam ~~(IB)~~ an observation region ~~(MR)~~ which is occupied or transited by a plurality of particles ~~(B)~~, a portion of the beam ~~(IB)~~ giving rise to radiation ~~(SW)~~ which is scattered by scattering interaction of that portion of the beam ~~(IB)~~ with the particles ~~(B)~~, and another portion ~~(TB)~~ being transmitted substantially undisturbed along the principal axis ~~(z)~~ through the observation region ~~(MR)~~, and

detecting, in a plane ~~(M)~~ disposed on the propagation direction ~~(z)~~, a plurality of radiation intensity values which are determined by the interference between the scattered radiation ~~(SW)~~ and the transmitted radiation ~~(TB)~~,

~~characterized in that it further comprises the steps of:~~

identifying systems of interference fringes associated respectively with the individual particles ~~(B)~~ in which the interference pattern is affected by a phase delay of the scattered radiation ~~(SW)~~ relative to the transmitted radiation ~~(TB)~~, the delay being determined by the interaction of the radiation beam ~~(IB)~~ with the particles ~~(B)~~, and

determining the properties of the particles ~~(B)~~ on the basis of the fringes that are affected by the phase delay.

2. (Original) A method according to Claim 1 in which the identification of the interference fringe systems comprises a determination of the fractional order at the centre relative to the individual fringe systems.

3. (Currently Amended) A method according to Claim 1 ~~or Claim 2~~ in which the identification of the interference fringe systems comprises a determination of the depth of intensity modulation relative to the individual fringe systems.

4. (Currently Amended) A method according to ~~any one of Claims 1 to 3~~ claim 1 in which the radiation beam ~~(IB)~~ has a plane wave front.

5. (Currently Amended) A method according to Claim 4 in which the detection plane ~~(M)~~ is disposed at a predetermined distance $z_M$ from the observation region ~~(MR)~~ such that the relationship $z_M > a^2 / \lambda$ is valid, where $\lambda$ is a characteristic value for the wavelength of the radiation used and a is dimension which is characteristic of the particles contained in the observation region ~~(MR)~~.

6. (Currently Amended) A method according to ~~any one of Claims 1 to 3~~ claim 1 in which the radiation beam ~~(IB)~~ is focused in the vicinity of the observation region ~~(MR)~~.

7. (Currently Amended) A method according to Claim 6 in which the position of the observation region ~~(MR)~~ is selected so as to be outside the Rayleigh zone ~~(RZ)~~ close to the position of smallest diameter of the beam ~~(IB)~~.

8. (Currently Amended) A method according to ~~any one of Claims 1 to 3~~ claim 1 in which the radiation is focused by means of a cylindrical lens ~~(2'''')~~ so as to form a thin blade of light ~~(4'''')~~ which illuminates the observation region ~~(MR)~~ substantially one-dimensionally.

9. (Currently Amended) A method according to ~~any one of the preceding claims~~ claim 1 in which the illumination and the detection are performed from opposite sides of the observation region ~~(MR)~~.

10. (Currently Amended) A method according to ~~any one of the preceding claims~~ claim 1, arranged so as to determine the fractional order at the centre of the system of interference fringes produced by a single particle at a time.

11. (Currently Amended) A method according to ~~any one of the preceding claims~~ claim 1 in which the detection of the plurality of radiation intensity values determined by the interference between the scattered radiation ~~(SW)~~ and the transmitted radiation ~~(TB)~~ comprises a measurement of the variation of the intensity values over time upon the passage of a particle ~~(B)~~ through the incident beam ~~(IB)~~,

the determination of the properties of the particle ~~(B)~~ being based on the variation over time of the fringes that are affected by the phase delay.

12. (Currently Amended) A method according to Claim 11 in which the determination of the properties of the particles ~~(B)~~ presupposes the determination of the position of transit of the particle ~~(B)~~ through the incident beam ~~(IB)~~ by analysis of the

asymmetry of the variation over time of the intensity values measured.

13. (Currently Amended) A method according to Claim 11 in which the measurement of the variation of the intensity values over time takes place by selection of the zone of transit of the particles ~~(B)~~.

14. (Currently Amended) A method according to ~~any one of Claims 1 to 9~~ claim 1 in which the determination of the interference fringe systems associated respectively with the particles ~~(B)~~ comprises a determination of the centres ~~($C_k$)~~ of a plurality of interference fringe systems produced by a corresponding plurality of particles ~~(B)~~.

15. (Currently Amended) A method according to Claim 14 in which the determination of the interference fringe systems associated respectively with the particles ~~(B)~~ comprises a determination of a power spectrum of the electric field corresponding to the plurality of radiation intensity values.

16. (Currently Amended) A method according to ~~any one of the preceding claims~~ claim 1 in which the determination of the properties of the particles ~~(B)~~ on the basis of the lower-order fringes of the system of fringes is programmed in a manner such as to determine the distribution of the dimensions of the particles ~~(B)~~.

17. (Currently Amended) Apparatus arranged for implementing a measurement method according to Claim 1, comprising:

a source ~~(1; 1''')~~ of the radiation beam ~~(IB)~~, suitable for illuminating the observation region ~~(MR)~~,

sensor means ~~(3; 3''')~~ suitable for detecting the radiation at a plurality of points simultaneously and for making available a signal indicative of the detection, the sensors being disposed on the propagation axis ~~(z)~~ in a manner such as to detect a plurality of radiation intensity values which are determined by the interference between the scattered radiation ~~(SW)~~ and the transmitted radiation ~~(TB)~~, in which the interference is affected by a phase delay of the scattered radiation ~~(SW)~~ relative to the transmitted radiation ~~(TB)~~, the delay being determined by the interaction of the radiation beam ~~(IB)~~ with the particles ~~(B)~~, and

processing means which are programmed to determine, on the basis of the signal, interference fringe systems associated respectively with the individual particles ~~(B)~~, and to determine the properties of the particles ~~(B)~~ on the basis of the fringes which are affected by the phase delay.

18. (Currently Amended) Apparatus according to Claim 17, further comprising lens means interposed between the observation region ~~(MR)~~ and the sensor means ~~(3; 3''')~~ so as to permit indirect detection by detection of the plurality of intensity values in an optically conjugate plane.

19. (Currently Amended) Apparatus according to Claim 17 ~~or Claim 18~~, further comprising a system ~~(2''')~~ for shaping the wave front, based on cylindrical optics such as to form a thin blade of radiation ~~(4''')~~ for the illumination of the observation region ~~(MR)~~.

20. (Currently Amended) Apparatus according to Claim 17 ~~or Claim 18~~, further comprising a system ~~(2)~~ for shaping the wave front, suitable for focusing the radiation in the vicinity of the observation region ~~(MR)~~.

21. (Currently Amended) Apparatus according to Claim 17 ~~to 18~~, further comprising a system for shaping the wave front, suitable for collimating the radiation that is incident on the observation region ~~(MR)~~.

22. (Currently Amended) Apparatus according to ~~any one of Claims 17 to 21~~ claim 17 in which the sensor means ~~(3; 3''')~~ comprise a CCD, NMOS or CMOS sensor.

23. (Currently Amended) Apparatus according to ~~any one of Claims 17 to 21~~ claim 17 in which the sensor means ~~(3; 3''')~~ comprise a plurality of photodiodes arranged in manner such as to detect, as a function of time, the intensity distribution produced by the interference between transmitted radiation ~~(TB)~~ and scattered radiation ~~(SW)~~.

24. (Original) Apparatus according to Claim 23 in which the photodiodes are arranged in a manner such as to pick up selectively radiation coming from predetermined zones of transit of the particles ~~(B)~~.

25. (Currently Amended) Apparatus according to any ~~one of Claims 17 to 24~~ claim 17 in which the source ~~(1; 1''')~~ is a multi-coloured source.